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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,935	12/18/2001	Alan Sullivan	30231/40	7292

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EXAMINER

TRAN, TAM D

ART UNIT	PAPER NUMBER
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2676

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DATE MAILED: 03/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/026,935

Applicant(s)

SULLIVAN ET AL.

Examiner

Tam D. Tran

Art Unit

2676

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE \_\_\_\_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12/29/2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,4-9,12,13,16-23,48,50-55,58,59 and 62-91 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-9,12,13,16-23,48,50-55,58,59,62-69 and 76-91 is/are rejected.
- 7) ☒ Claim(s) 6,8,52,54 and 70-75 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |  |
|---|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4-9, 12, 13, 16-23, 48, 50, 51-55, 58, 59, 62-69, 76-91, are rejected under 35 U.S.C. 102(b) as being anticipated by Mochizuki et al. (USPN 5706816), hereinafter simply Mochizuki.

2. In regard to claims 1, 47, Mochizuki teaches a system and method of processing three-dimensional image data for a three-dimensional volumetric display having a plurality of display elements, the method comprising: generating three-dimensional image data, see col.3 lines 59-67, comprising (x,y,z) coordinate and color information, wherein the z-coordinate information represents image depth information; see col.9 lines 31-36, and storing the three dimensional image data at locations in a multiplanar frame buffer in accordance with the z-coordinate information. See col.8 lines 1-3.

3. In regard to claims 2, 48, Mochizuki teaches a system and method of displaying a three-dimensional image wherein the storing comprises: reading the z-coordinate information; scaling the z-coordinate information within a range corresponding to one or more display elements in the three-dimensional volumetric display upon which the three-dimensional image is to be displayed; see col.7 lines 55-61; and assigning memory

locations in the multiplanar frame buffer for the three-dimensional image data based on the scaled z-coordinate information. See col.8 lines 1-3.

4. In regard to claims 4, 50, Mochizuki teaches a system and method of displaying a three-dimensional image wherein the storing comprises storing image data having substantially identical z-coordinate information in memory locations of the frame buffer that are logically substantially proximate. See col.8 lines 1-3.

5. In regard to claims 5, 51, Mochizuki teaches a system and method of displaying a three-dimensional image further comprising displaying an image on a display having addressable (x,y,z) coordinates. See col.7 lines 55-62.

6. In regard to claims 7, 53, Mochizuki teaches a system and method of displaying a three-dimensional image further comprising displaying an image on a display having addressable (r, Y, and theta) coordinates. See col. 10-55.

7. In regard to claims 9, 55, Mochizuki teaches a system and method of displaying a three-dimensional image wherein storing comprises: providing a first memory at least as large as the frame buffer; filling the first memory with the three dimensional image data; and transmitting the contents of the first memory location to the frame buffer in a single operation. See col.8 lines 62-67.

8. In regard to claims 12, 58, Mochizuki teaches a system and method of displaying a three-dimensional image further comprising transmitting the three-dimensional image data to a display in accordance with the z-coordinate information. See col.9 lines 34-36.

9. In regard to claims 13, 59, Mochizuki teaches a system and method of displaying a three-dimensional image wherein the image data further comprises transparency information and brightness information. See col.11 lines 15-27.

10. In regard to claims 16, 62, Mochizuki teaches a system and method of displaying a three-dimensional image further comprising displaying an image on a three dimensional volumetric display. See col.11 lines 15-55.

11. In regard to claims 17, 63, Mochizuki teaches a system and method of displaying a three-dimensional image wherein the three dimensional volumetric display comprises multiple planes upon which image data is displayed. See col.2 lines 13-40.

12. In regard to claims 18, 64, Mochizuki teaches a system and method of displaying a three-dimensional image wherein the three dimensional volumetric display comprises a plurality of self-luminescent optical elements. See col.11 lines 15-55.

13. In regard to claims 19, 65, Mochizuki teaches a system and method of displaying a three-dimensional image wherein the three dimensional volumetric display is a swept-volume display. See col. 11 lines 15-55.

14. In regard to claims 20, 66, Mochizuki teaches a system and method of displaying a three-dimensional image wherein generating comprises generating the three-dimensional image data with a personal computer. See col.2 lines 42-50.

15. In regard to claims 21, 67, Mochizuki teaches a system and method of displaying a three-dimensional image wherein generating comprises converting data corresponding to a three-dimensional image into data corresponding to a plurality of two-dimensional cross-sectional images of the three-dimensional image. See col.4 lines 10-27.

16. In regard to claims 22, 68, Mochizuki teaches a system and method of displaying a three-dimensional image wherein the generating comprises generating the three-dimensional image data using application program interface calls. See col.3 lines 59-67.

17. In regard to claims 23, 69, Mochizuki teaches a system and method of displaying a three-dimensional image wherein generating comprises generating data indicating a plurality of geometric primitives that define three-dimensional image. See col.4 lines 10-27.

18. In regard to claims 76-79, Mochizuki teaches a system and method of displaying a three-dimensional image, wherein the storing comprises storing the three-dimensional image data having substantially identical z-coordinate information in memory locations within one common physical partition of the multiplanar frame buffer. See col.8 lines 1-3.

19. In regard to claims 80, 81, Mochizuki teaches a system and method of displaying a three-dimensional image, wherein the multiplanar frame buffer is located in the three-dimensional volumetric display. See col.8 lines 62-67.

20. In regard to claims 82, 83, Mochizuki teaches a system and method of displaying a three-dimensional image, wherein the first memory comprises a multiplanar frame buffer (frame memory has X-Y addresses). See col.8 lines 62-67.

21. In regard to claims 84, 88, Mochizuki teaches a system and method of displaying a three-dimensional image, wherein the storing comprises: processing the three dimensional image data; assigning memory locations in the multiplanar frame buffer for the three dimensional image data in accordance with the (x,y,z) coordinate information; see col.22 lines 30-36, and transferring the processed three dimensional image data to the assigned memory locations in the multiplanar frame buffer (transmitting and receiving ultrasound beams to and from a three dimensional region). See col.22 lines 45-48.

Art Unit: 2676

22. In regard to claims 85, 89, Mochizuki teaches a system and method of displaying a three-dimensional image, wherein the processing comprises performing depth testing (simple algorithm using for depth feeling). See col.14 lines 10-20.

23. In regard to claim 86, 90, Mochizuki teaches a system and method of displaying a three-dimensional image, wherein the processing comprises performing multiplanar antialiasing (beams are utilized as lines of vision). See col.20 lines 45-50.

24. In regard to claim 87, 91, Mochizuki teaches a system and method of displaying a three-dimensional image, wherein the processing comprises performing alpha blending (cumulative value of alpha). See col.15 lines 17-23.

***Allowable Subject Matter***

25. Claims 6, 8, 52, 54, 70-75, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

26. Applicant's arguments filed on 12/29/03, have been fully considered but they are not persuasive.

Applicant argues that the prior art does not teach "the frame buffer that has capacity to store and quickly transfer image data organized such that satisfactory three-dimensional images can be displayed, i.e., a multiplanar frame buffer." However, examiner respectfully disagrees with the argument because on col.8 lines 1-3, col.8 lines 62-67, Mochizuki teaches the frame memory storing Z coordinate data and X-Y coordinate data for generating three dimensional image data, which read on multiplanar frame buffer for

storing and transferring image data of three dimensional images. For these reasons, the rejections are maintained.

27. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

#### ***Conclusion***

28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Tam D. Tran** whose telephone number is **703-305-4196**. The examiner can normally be reached on MON-FRI from 8:30 – 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Matthew Bella** can be reached on **703-308-6829**.

**Any response to this action should be mailed to:**



Art Unit: 2676

Commissioner of Patents and Trademarks

Washington, D.C. 20231

**or faxed to:**

**(703) 872-9314 (for Technology Center 2600 only)**

Hand-delivered response should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service

Office whose telephone number is (703) 306-0377.

Tam Tran

*TT*  
Examiner

Art unit 2676



**MATTHEW C. BELLA  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600**